

James River - Richmond TMDL Development

**Final Public Meeting
March 10, 2009**





Purpose of this meeting

To discuss TMDLs for James River –
Richmond watershed

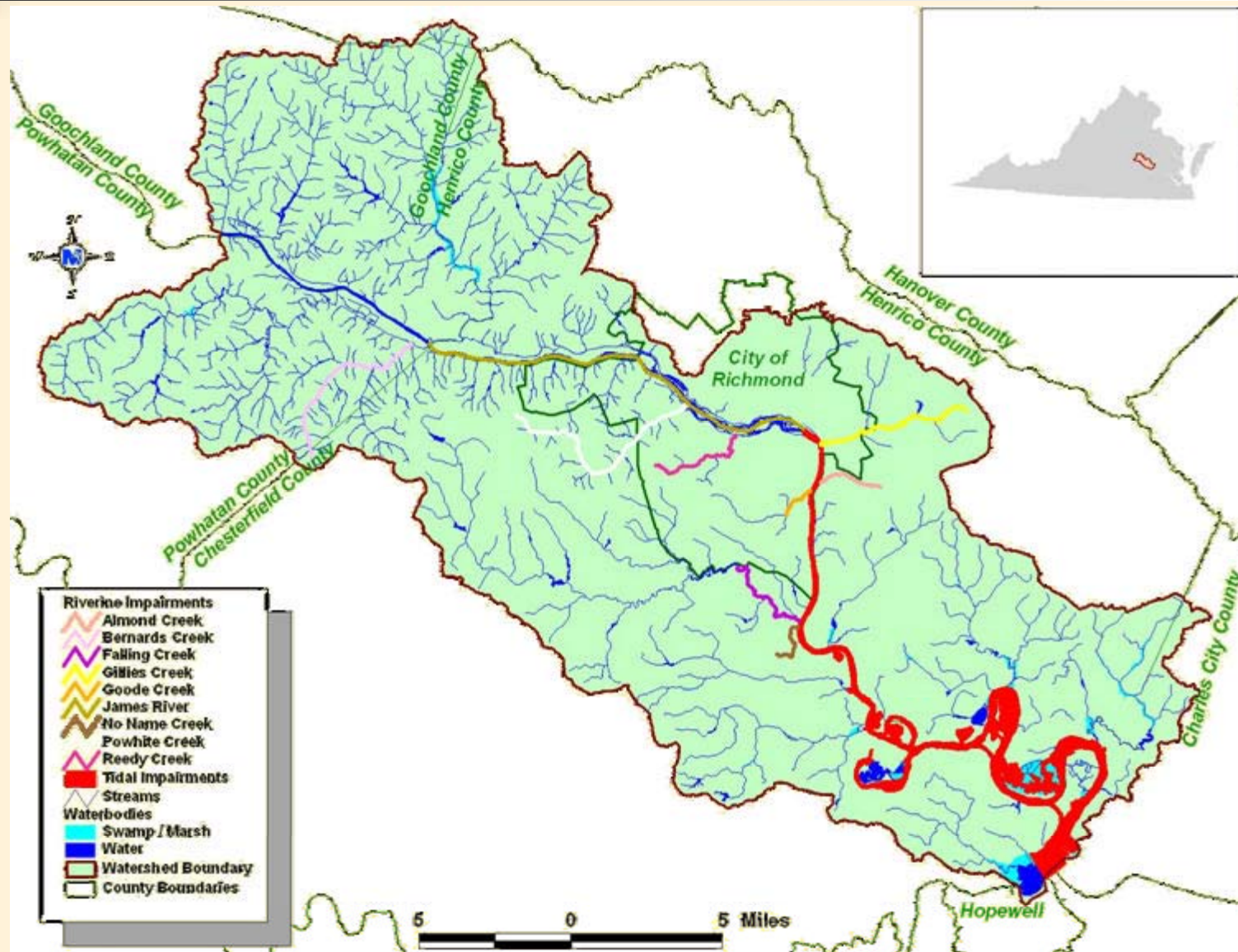
Total Maximum Daily Load is how much pollutant can
exist the stream and have the stream meet the water
quality standards







Impairment Locations





What are the Sources of Bacteria?

- Permitted Discharges
- Human
 - Failing Septics
 - Straight Pipes
- Pets
- Livestock
- Wildlife
- James River Tides

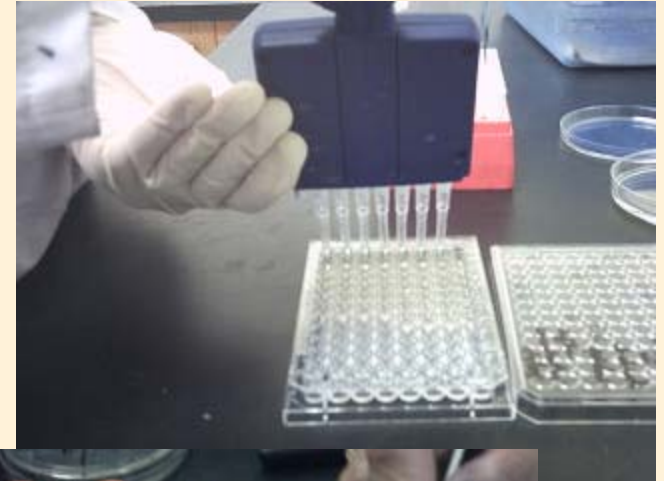




Bacterial Source Tracking (BST)

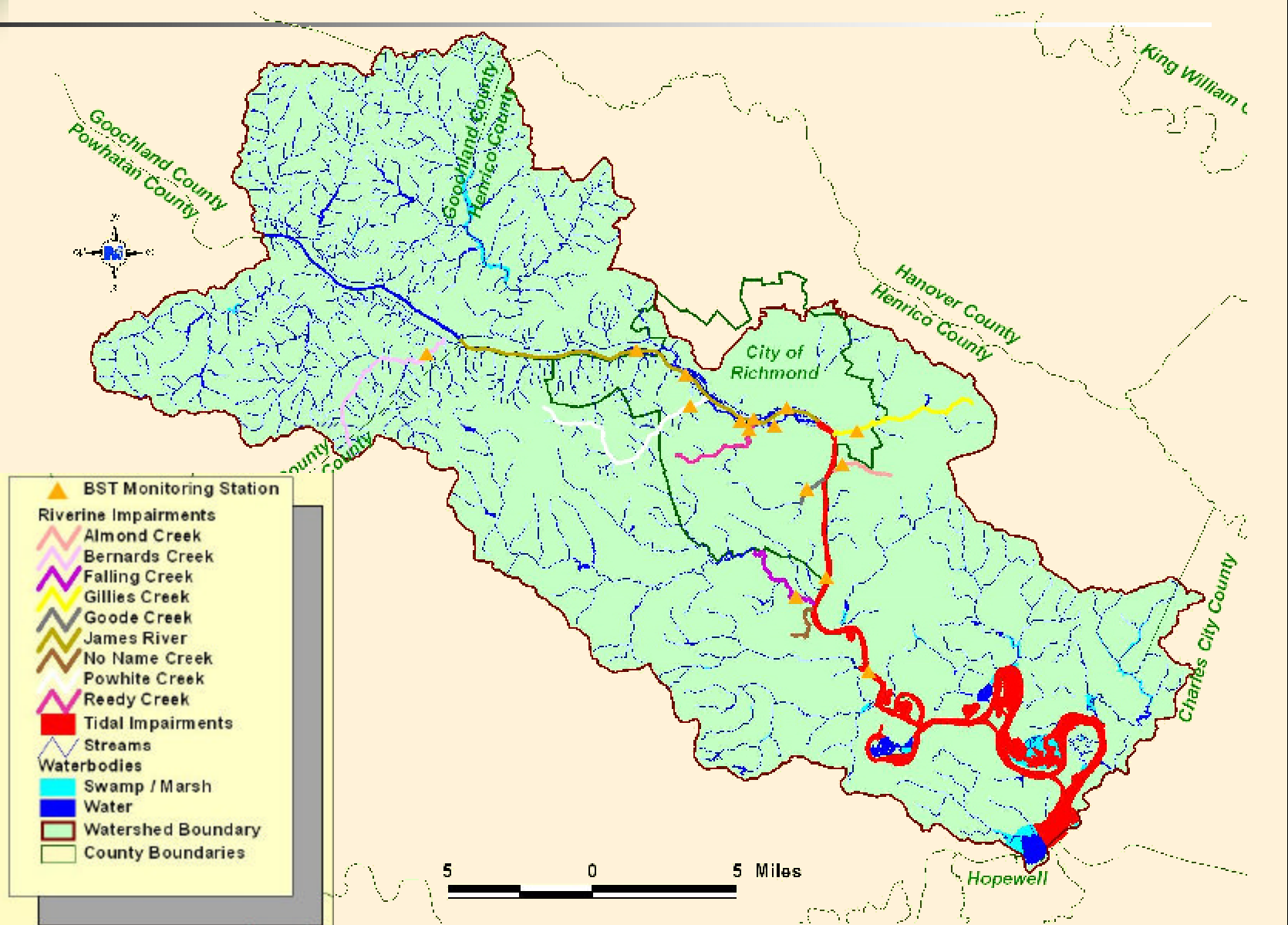
Independent Lab Test

- Determines bacteria source
 - human
 - pet
 - livestock
 - wildlife





BST Station Locations





What is the Predominant Source?

Stream Name	Station	Weighted Averages:				Anthropogenic (H+L+P)
		Wildlife	Human	Livestock	Pet	
Almond Creek	2-ALM000.42	65%	13%	9%	13%	35%
Bernards Creek	2-BOR001.73	44%	4%	32%	20%	56%
Falling Creek	2-FAC000.85	52%	13%	12%	23%	48%
Gillies Creek	2-GIL001.00	34%	20%	24%	22%	66%
Goode Creek	2-GOD000.77	69%	9%	7%	15%	31%
James River	2-JMS099.30	27%	20%	31%	22%	73%
James River	2-JMS104.16	31%	31%	22%	16%	69%
James River	2-JMS111.17	56%	14%	21%	9%	44%
James River	2-JMS111.47	52%	12%	22%	14%	48%
James River	2-JMS112.33	55%	5%	27%	13%	45%
James River	2-JMS112.79	53%	7%	26%	14%	47%
James River	2-JMS115.29	26%	16%	43%	13%	72%
James River	2-JMS117.35	73%	9%	10%	8%	27%
No Name Creek	2-XSZ001.58	60%	10%	5%	25%	40%
Powwhite Creek	2-PWT00.57	69%	12%	5%	14%	31%
Reedy Creek	2-RDD000.19	57%	9%	10%	24%	43%





Endpoint Determination

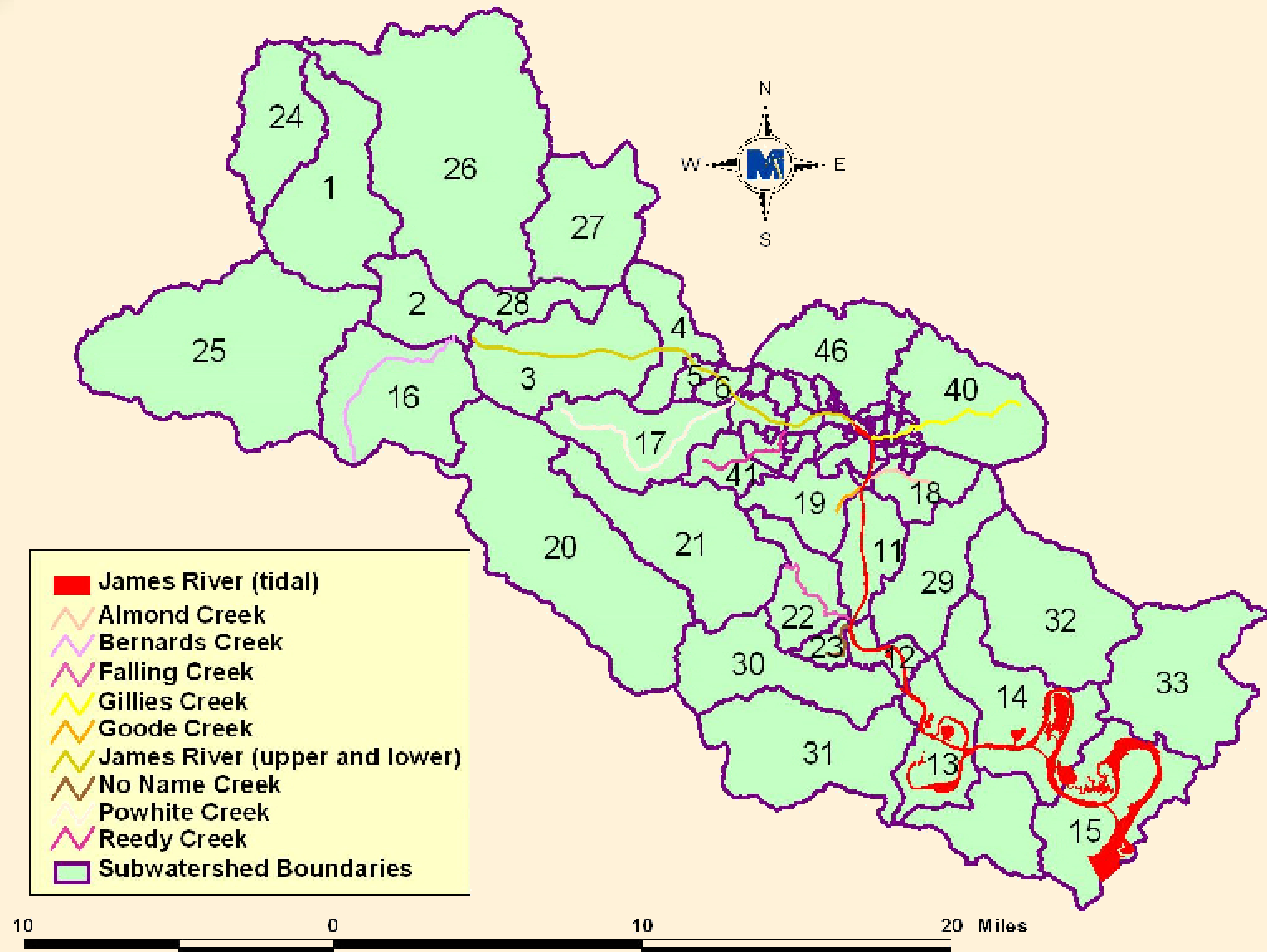
***E. coli* bacteria**

Two standards

- ◆ 126 cfu/100 ml geometric mean
- ◆ 235 cfu/100 ml instantaneous sample

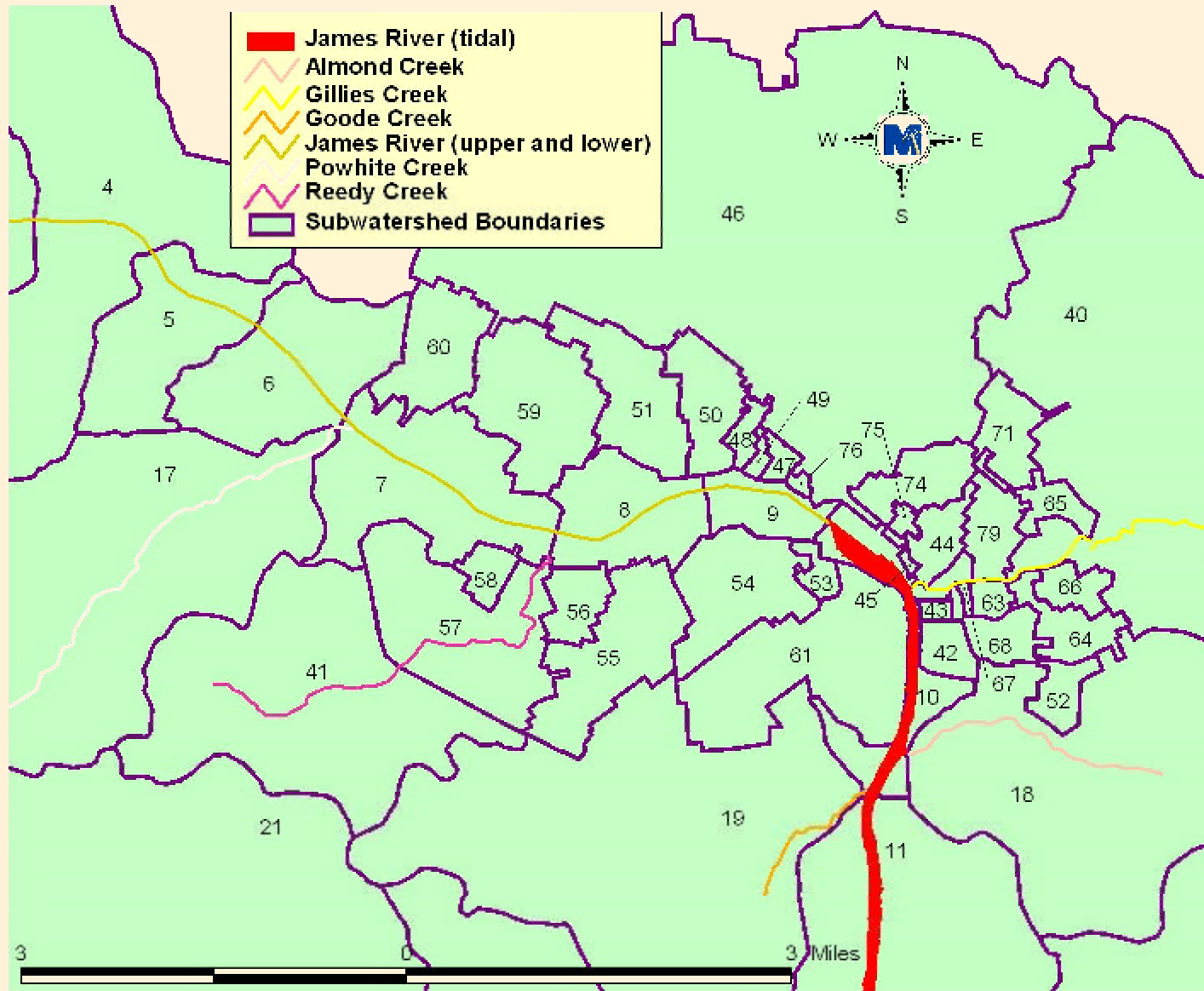


Subwatersheds





Subwatersheds



How Do We Determine the Bacteria TMDLs?



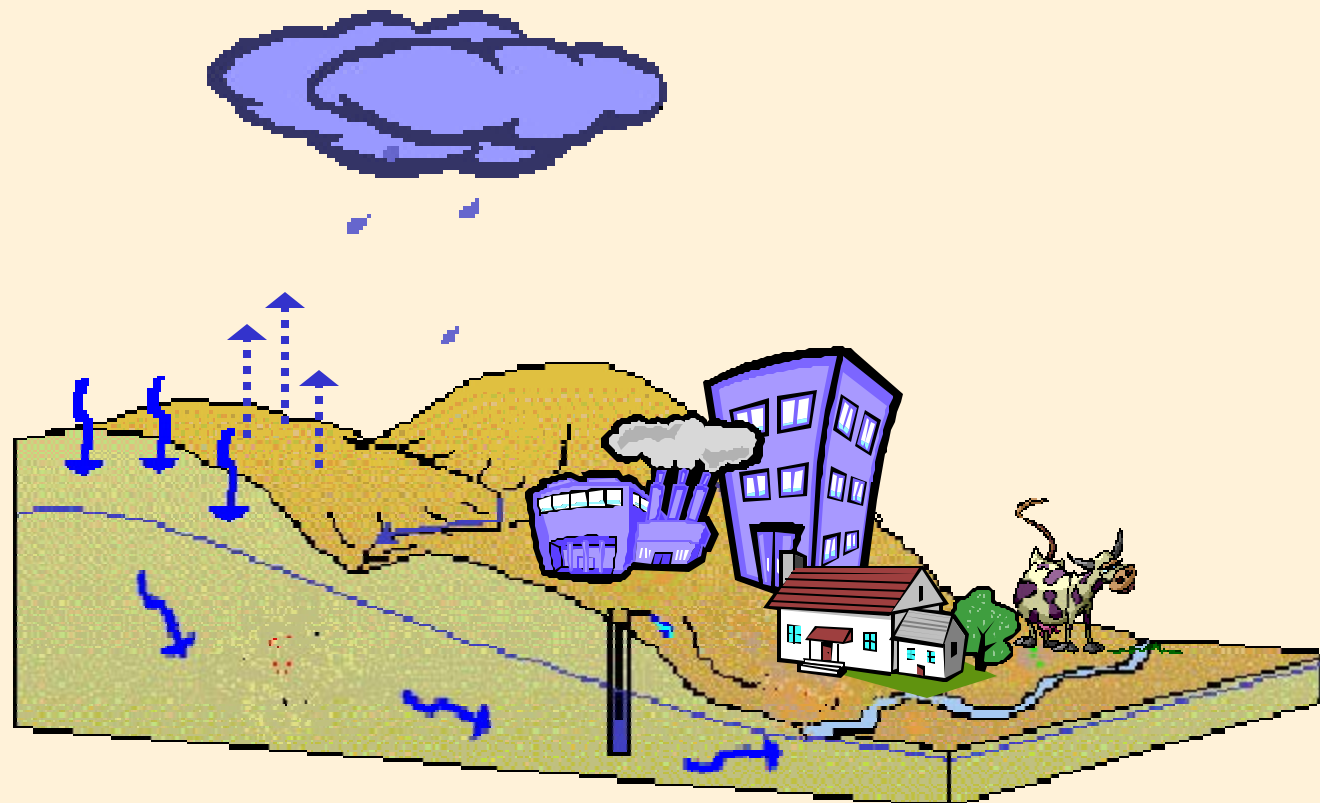
Watershed data



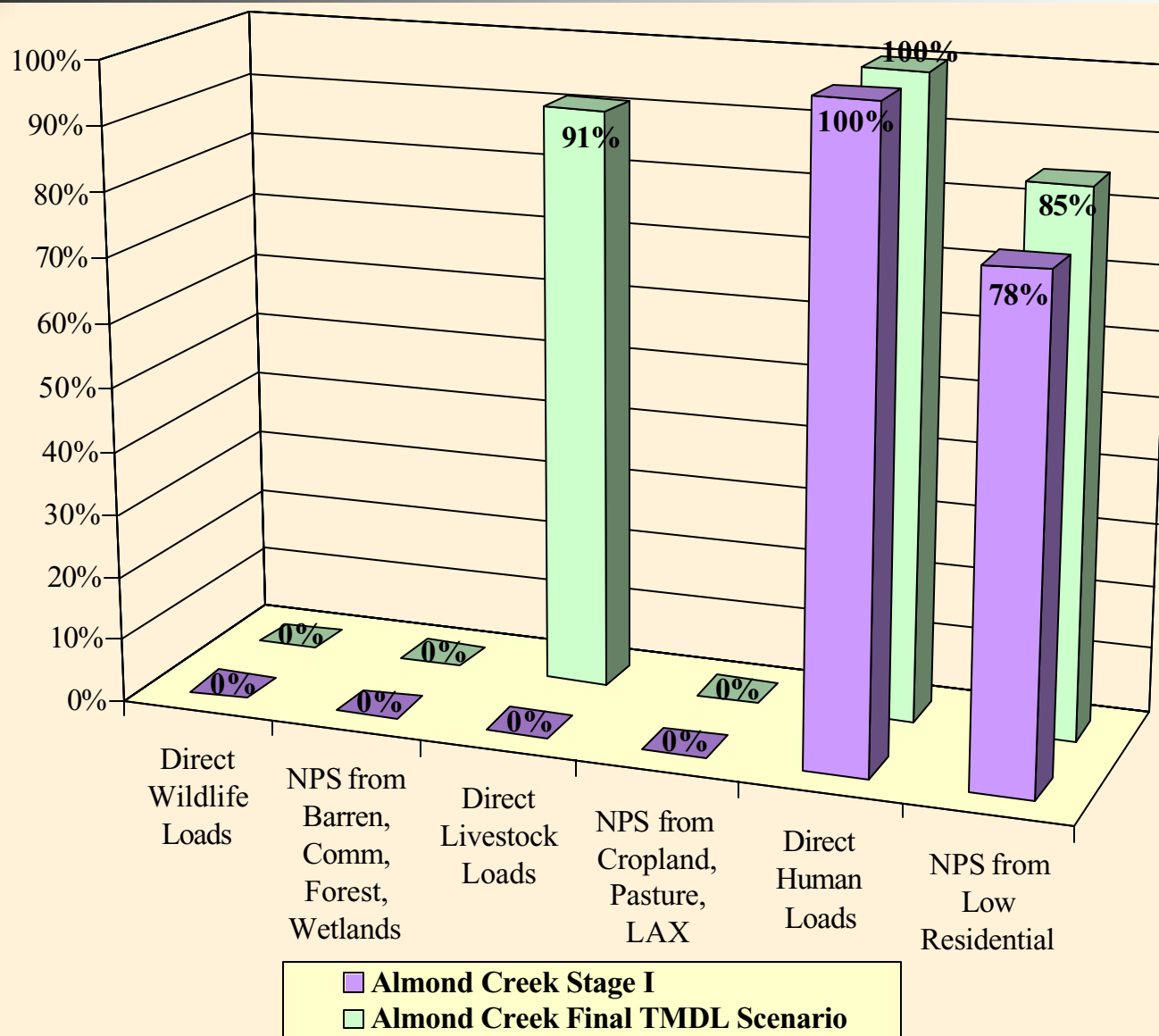
TMDL



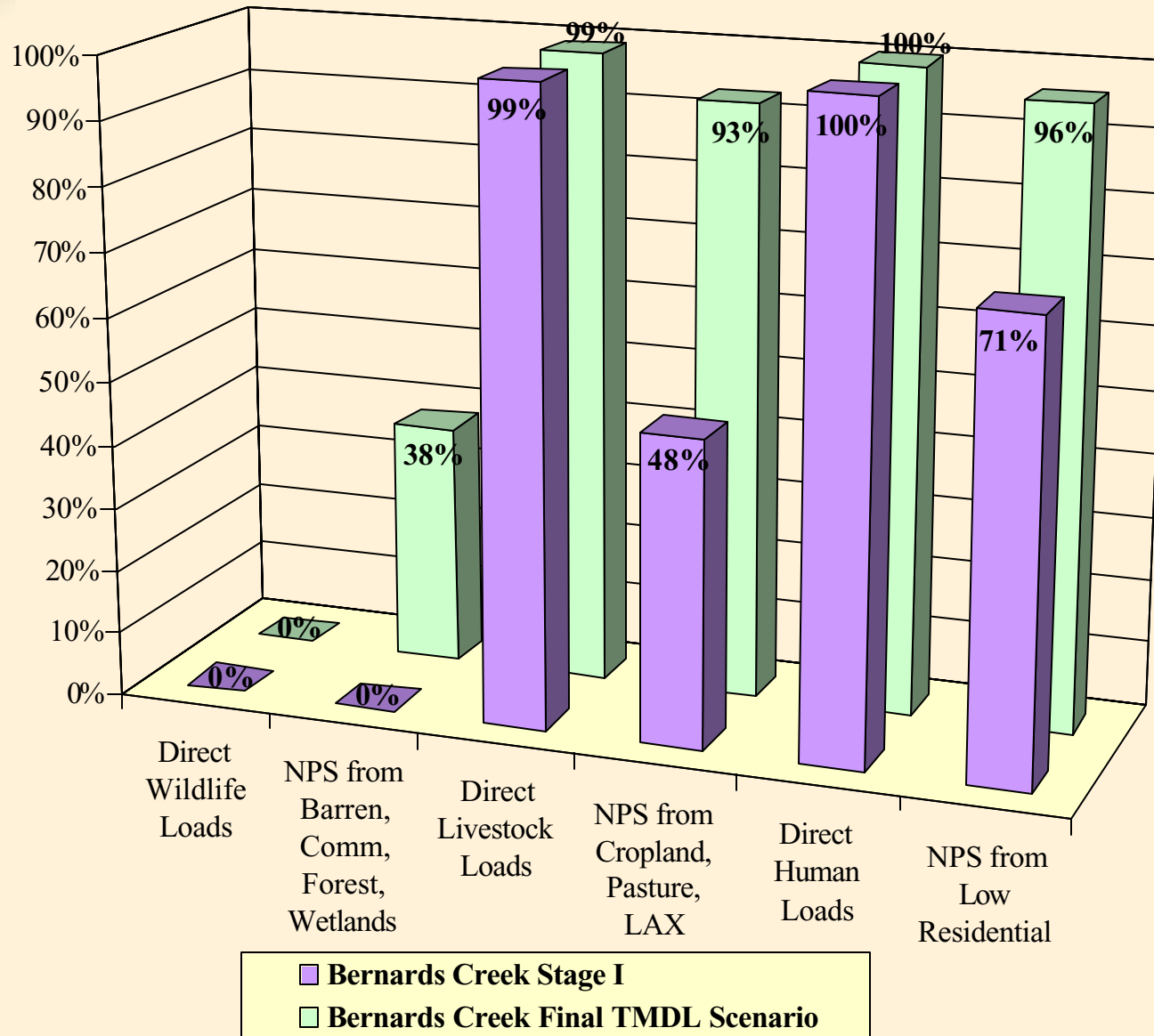
Modeling



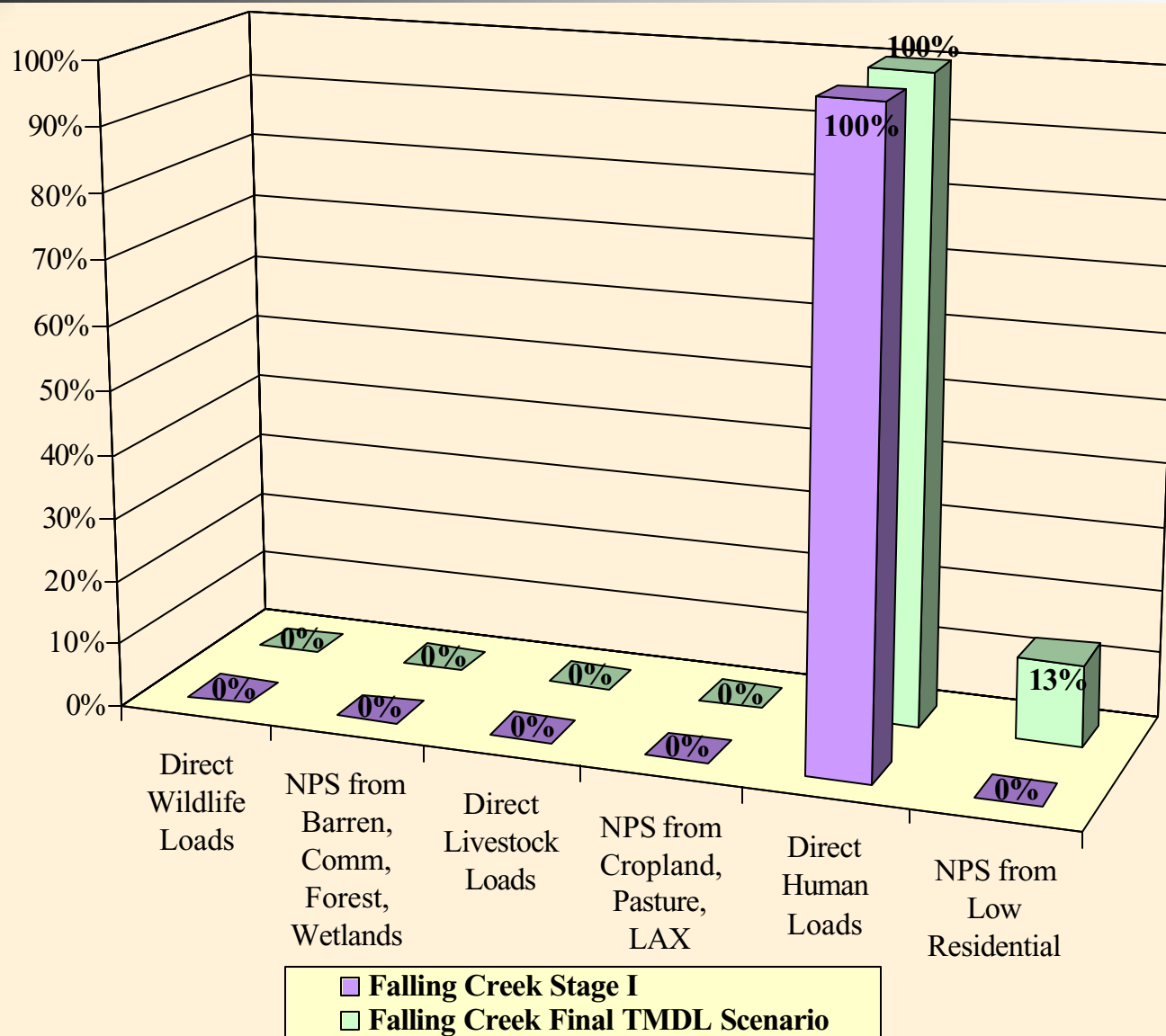
Almond Creek: *E. coli* Load Reductions



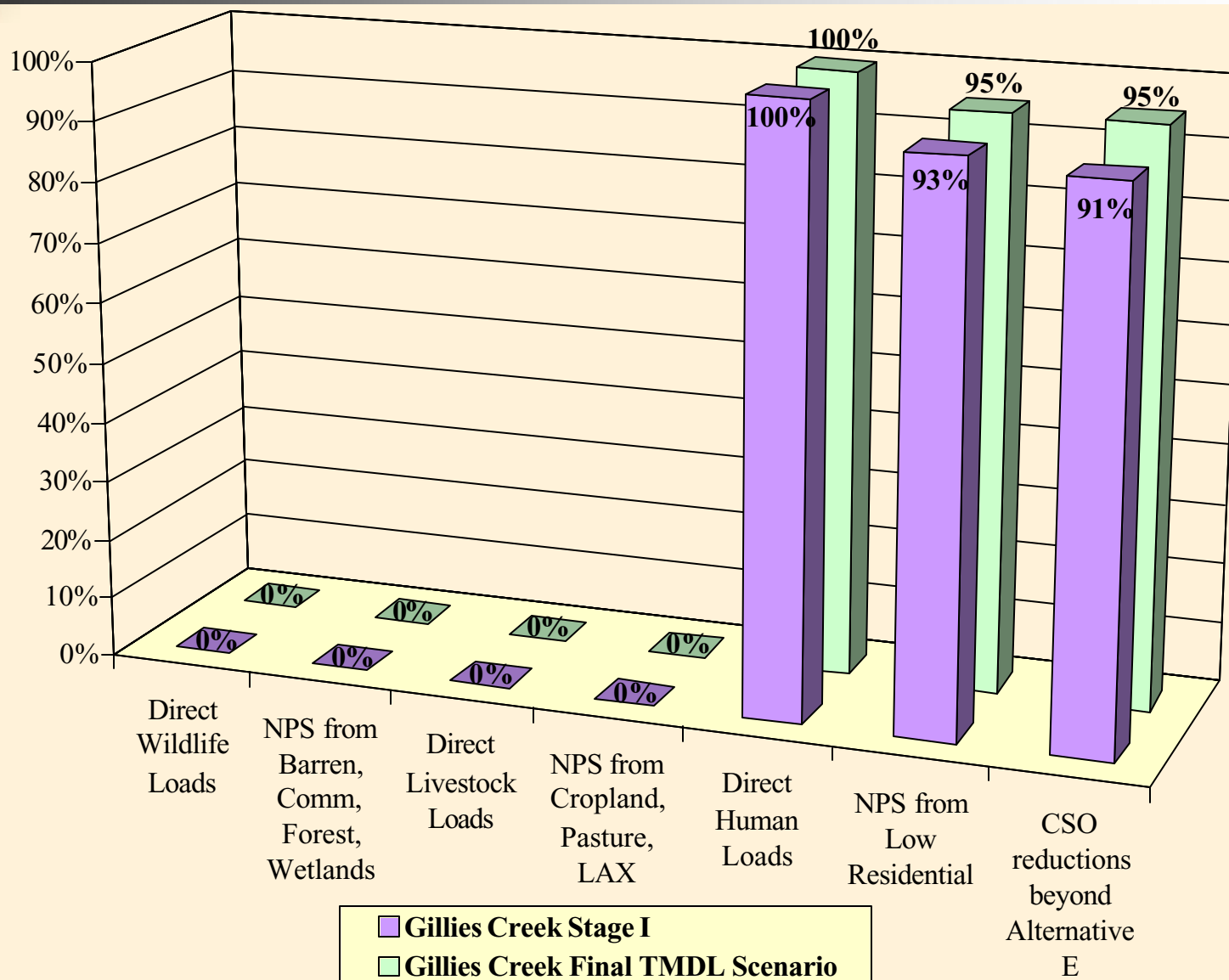
Bernards Creek: *E. coli* Load Reductions



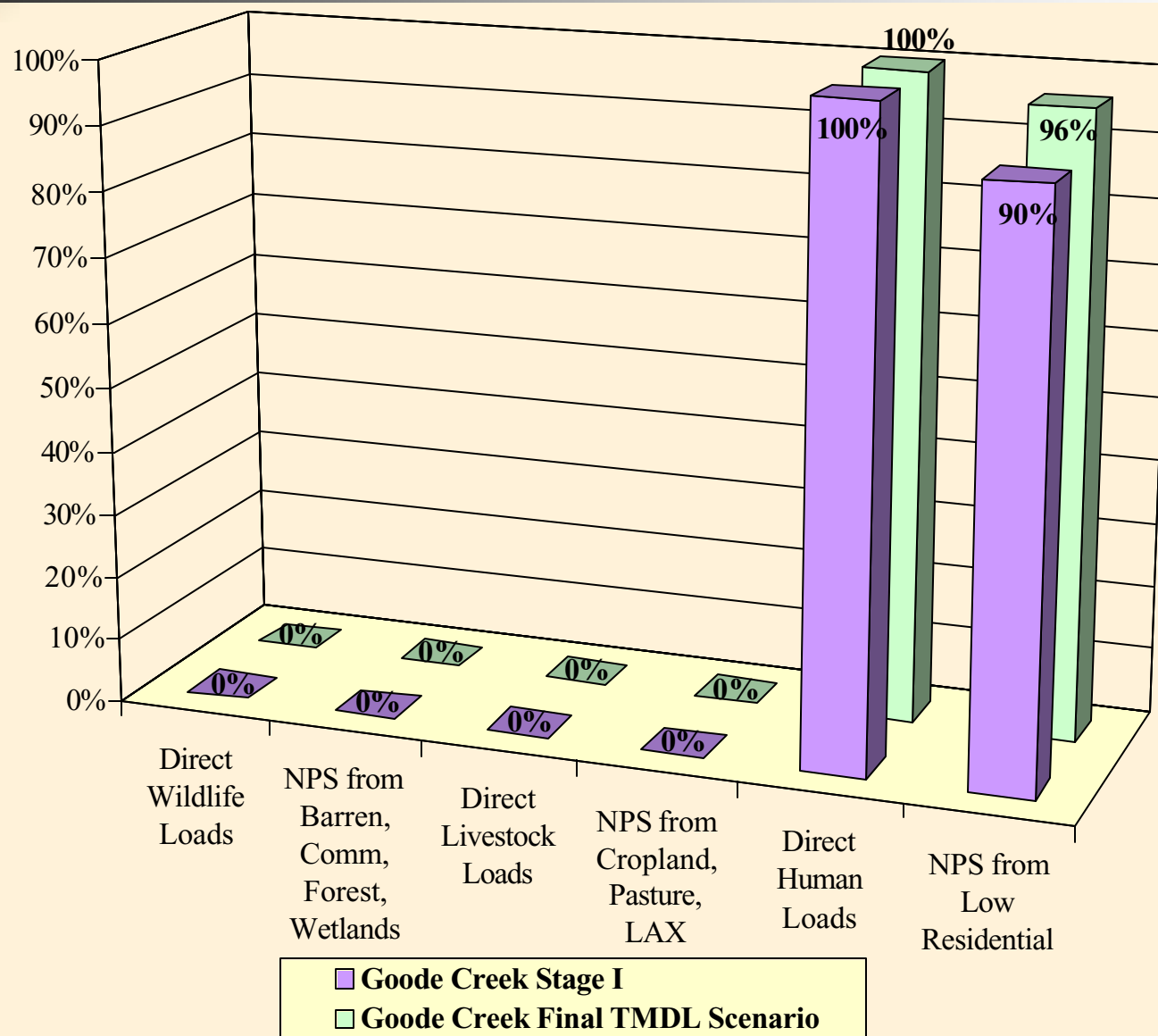
Falling Creek: *E. coli* Load Reductions



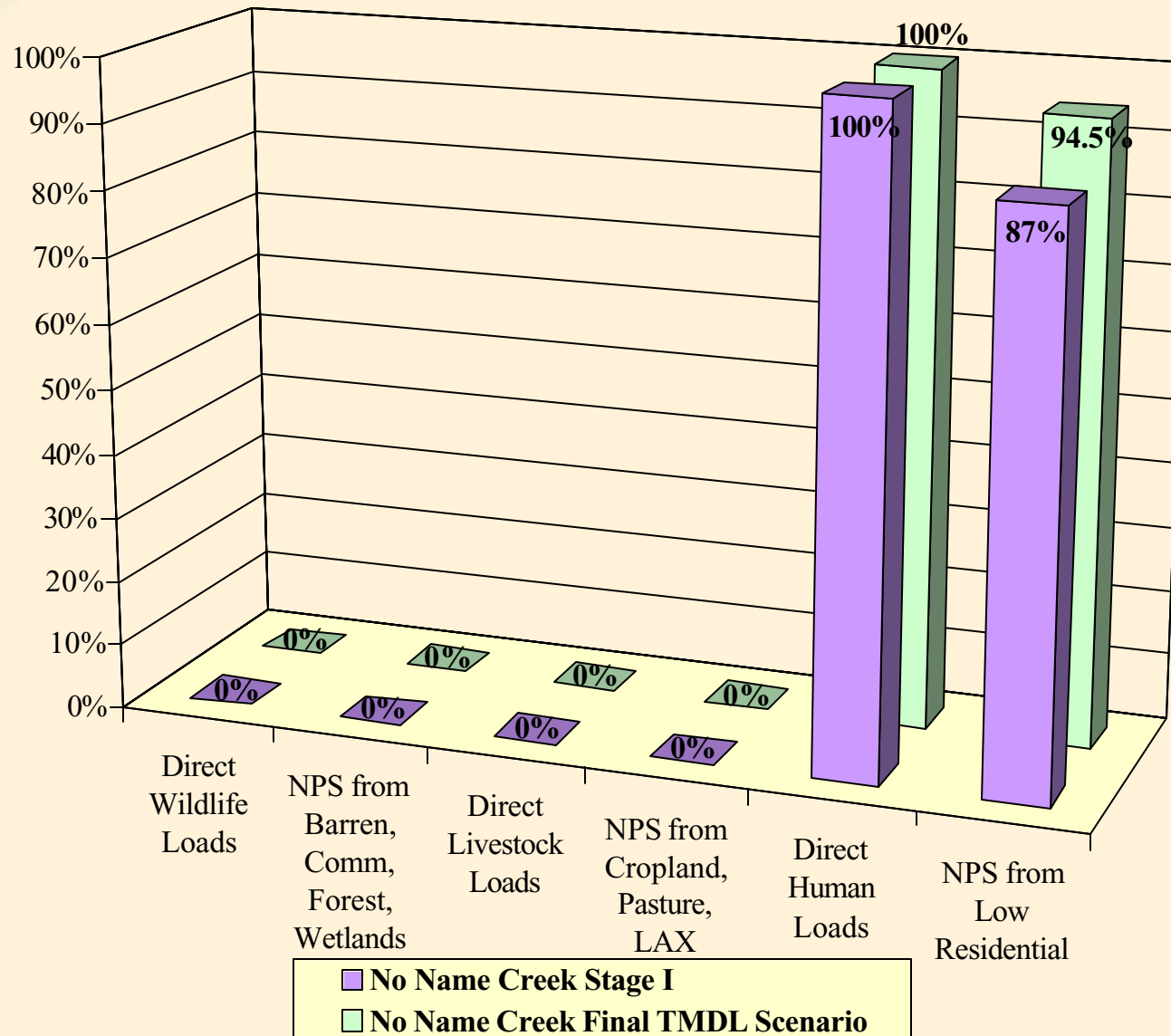
Gillies Creek: *E. coli* Load Reductions



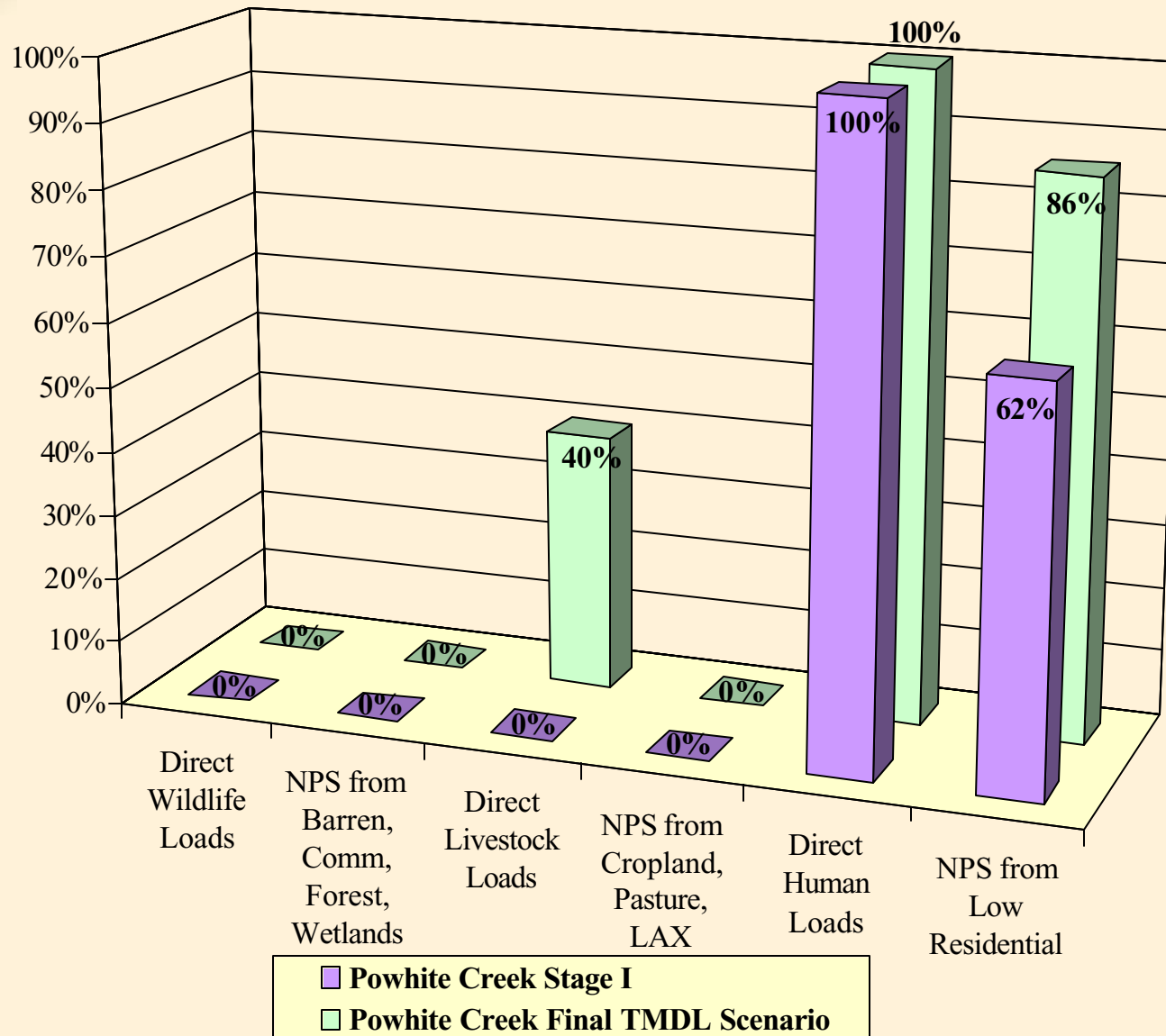
Goode Creek: *E. coli* Load Reductions



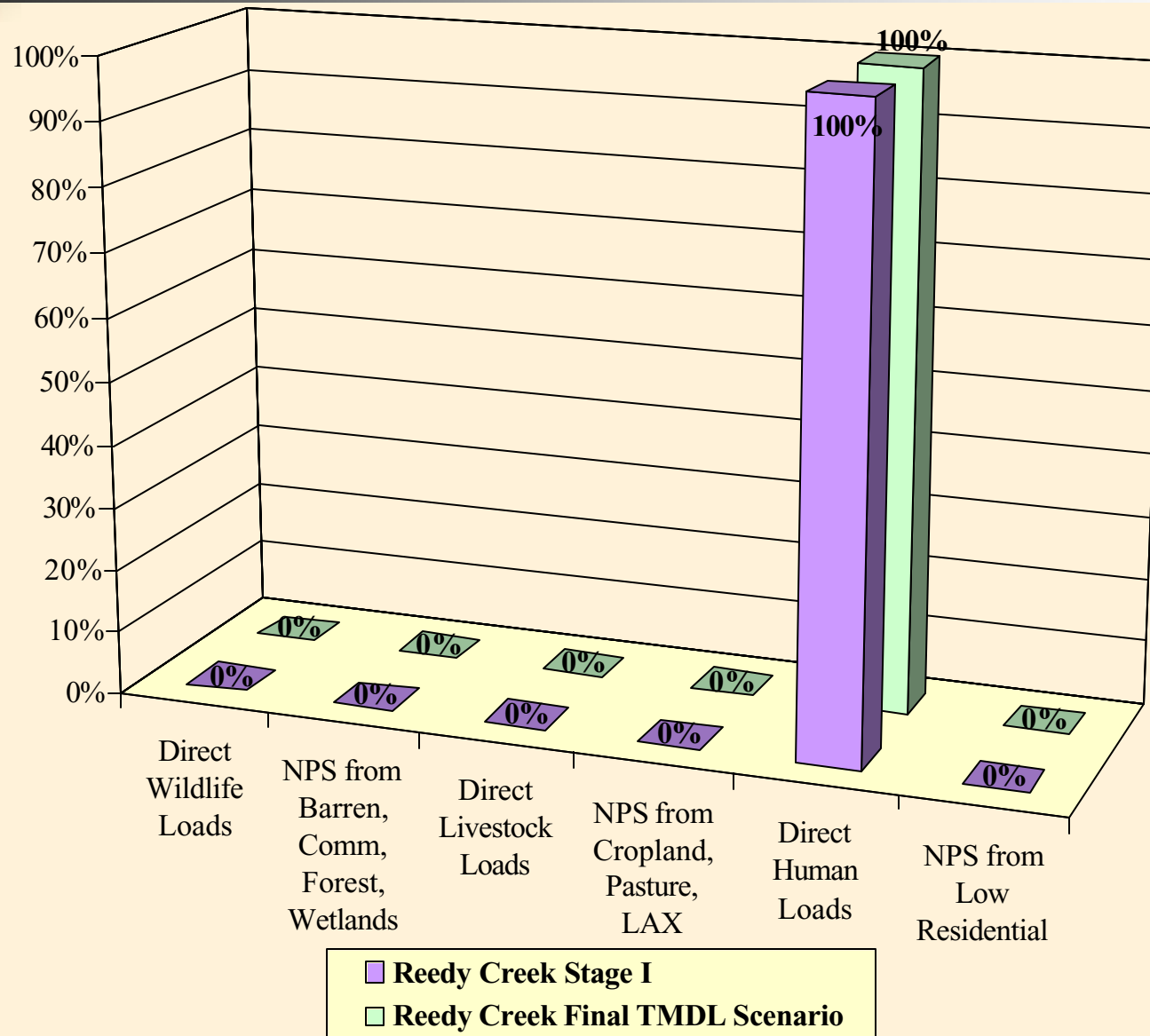
No Name Creek: *E. coli* Load Reductions



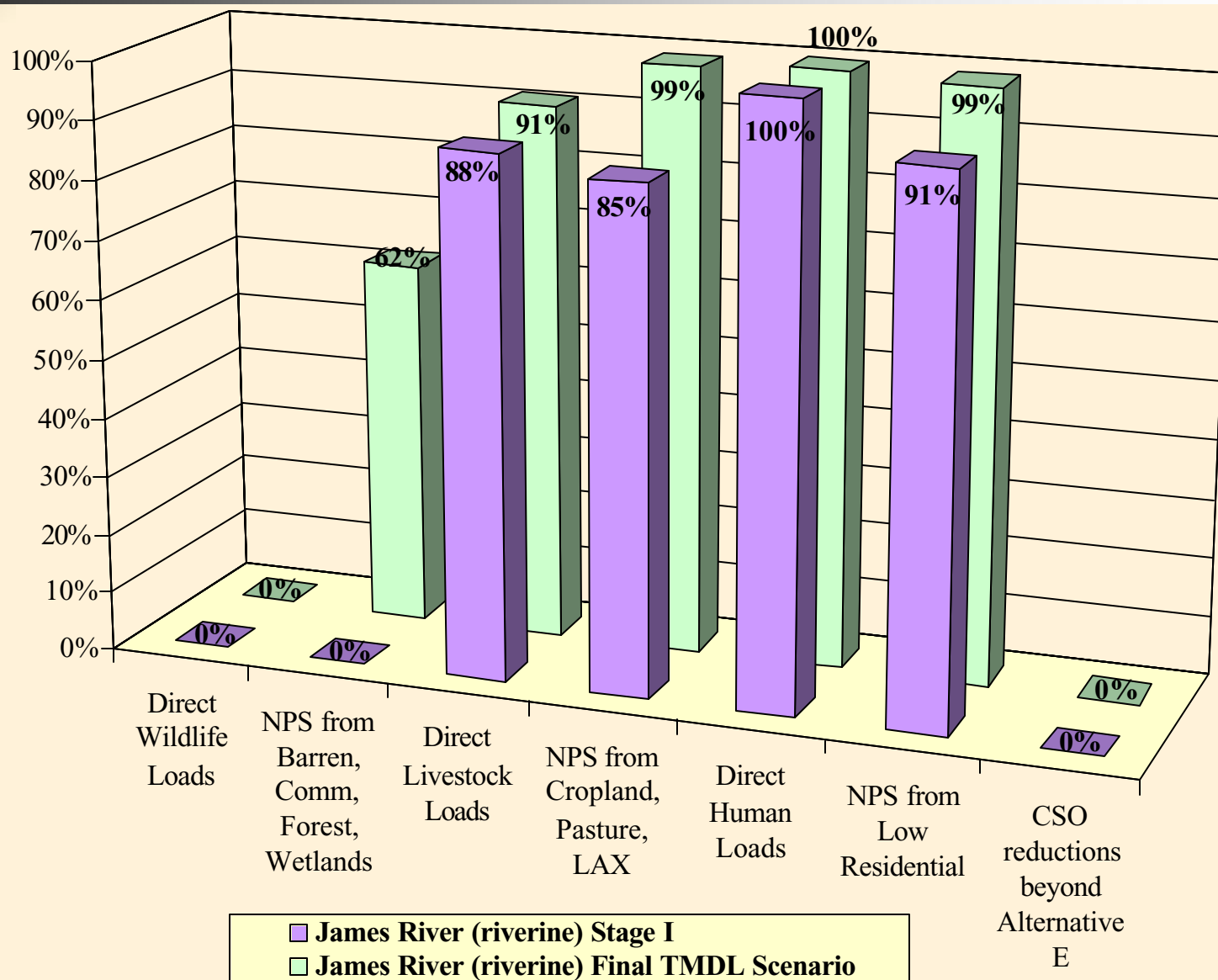
Powwhite Creek: *E. coli* Load Reductions



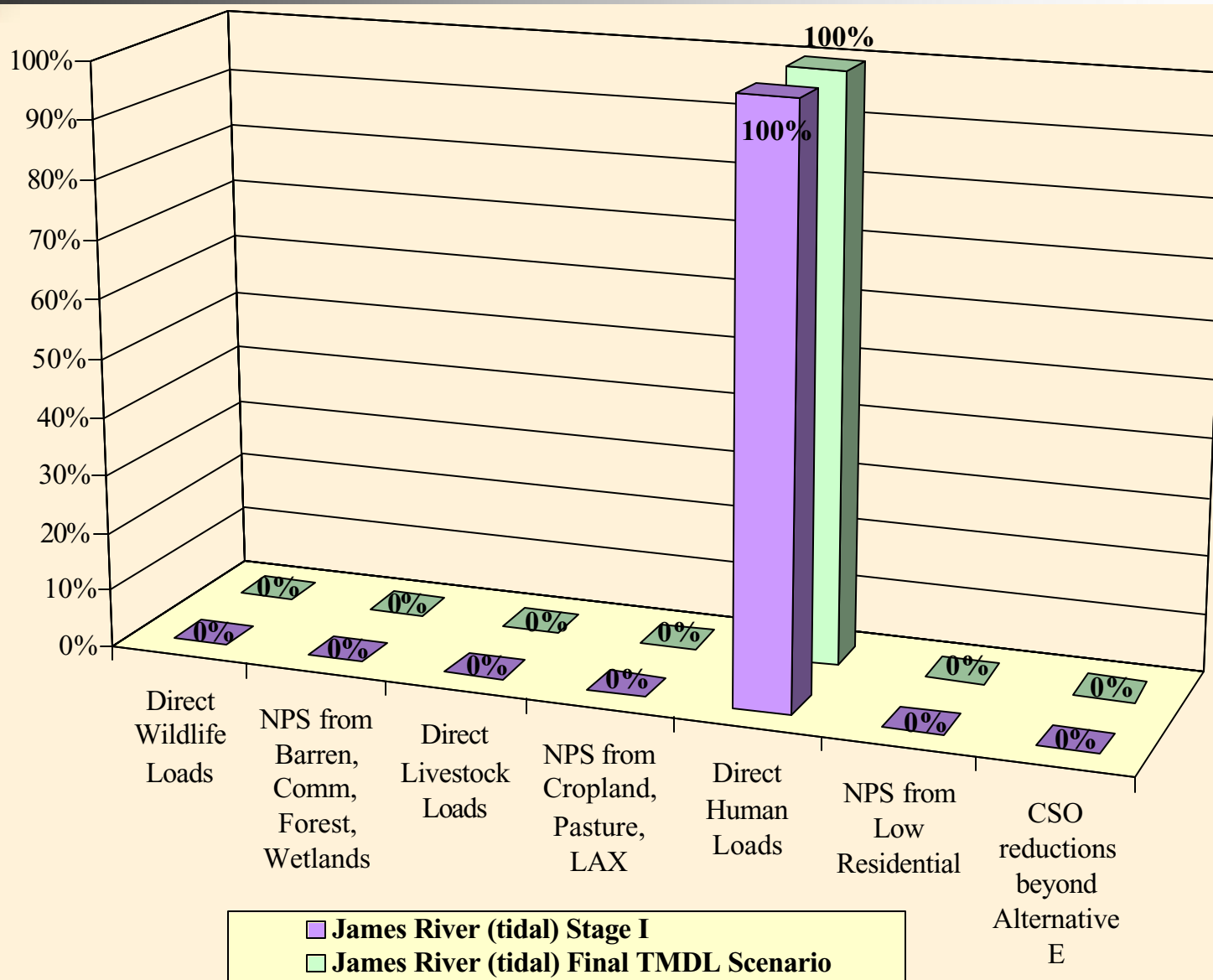
Reedy Creek: *E. coli* Load Reductions



James River (riverine): *E. coli* Load Reductions



James River (tidal): *E. coli* Load Reductions





Final *E. coli* TMDL Table

Impairment	WLA	LA	MOS	TMDL	Existing Load	Percent Reduction
Almond Creek	4.40E+12	2.27E+12	<i>Implicit</i>	6.67E+12	1.99E+13	66.50%
<i>VAG404029</i>	<i>1.74E+06</i>					
<i>MS4 City of Richmond</i>	<i>6.44E+10</i>					
<i>MS4 Henrico County DPW</i>	<i>1.18E+12</i>					
<i>VA0063177: CSOs</i>	<i>3.08E+12</i>					
<i>Future Load</i>	<i>6.67E+10</i>					
Bernards Creek	1.67E+12	1.65E+14	<i>Implicit</i>	1.67E+14	3.64E+14	54.10%
<i>Future Load</i>	<i>1.67E+12</i>					
Falling Creek	1.64E+13	7.92E+13	<i>Implicit</i>	9.56E+13	1.24E+14	22.80%
<i>VAG404238</i>	<i>1.74E+06</i>					
<i>MS4 Defense Supply Center - Richmond</i>	<i>5.60E+10</i>					
<i>MS4 City of Richmond</i>	<i>1.79E+12</i>					
<i>MS4 Chesterfield County</i>	<i>1.36E+13</i>					
<i>Future Load</i>	<i>9.56E+11</i>					
Gillies Creek	2.93E+12	3.13E+12	<i>Implicit</i>	6.06E+12	1.03E+14	94.10%
<i>MS4 City of Richmond</i>	<i>2.50E+11</i>					
<i>MS4 Henrico County DPW</i>	<i>5.89E+11</i>					
<i>VA0063177: CSOs</i>	<i>2.03E+12</i>					
<i>Future Load</i>	<i>6.06E+10</i>					



Final *E. coli* TMDL Table

Impairment	WLA	LA	MOS	TMDL	Existing Load	Percent Reduction
Goode Creek	2.52E+12	3.10E+12	<i>Implicit</i>	5.62E+12	7.42E+13	92.40%
<i>MS4 City of Richmond</i>	<i>2.47E+12</i>					
<i>Future Load</i>	<i>5.62E+10</i>					
NoName Creek	4.66E+11	1.15E+12	<i>Implicit</i>	1.61E+12	1.21E+13	86.70%
<i>MS4 Defense Supply Center - Richmond</i>	<i>1.23E+11</i>					
<i>MS4 Chesterfield County</i>	<i>3.27E+11</i>					
<i>Future Load</i>	<i>1.61E+10</i>					
Powwhite Creek	3.34E+12	3.31E+14	<i>Implicit</i>	3.34E+14	1.21E+15	72.30%
<i>MS4 City of Richmond</i>	<i>2.47E+12</i>					
<i>Future Load</i>	<i>3.34E+12</i>					
Reedy Creek	8.23E+13	9.72E+13	<i>Implicit</i>	1.80E+14	1.80E+14	0.10%
<i>MS4 City of Richmond</i>	<i>7.95E+13</i>					
<i>MS4 Chesterfield County</i>	<i>2.60E+12</i>					
<i>Future Load</i>	<i>2.15E+11</i>					



Final *E. coli* TMDL Table

Impairment	WLA	LA	MOS	TMDL	Existing Load	Percent Reduction
JR (lower) impaired	1.13E+14	6.49E+15	<i>Implicit</i>	6.60E+15	4.65E+17	98.60%
<i>VA0024163</i>	<i>3.48E+10</i>					
<i>VA0027910</i>	<i>1.74E+11</i>					
<i>VA0063649</i>	<i>6.97E+09</i>					
<i>VA0090727</i>	<i>4.36E+11</i>					
<i>MS4 City of Richmond</i>	<i>5.23E+13</i>					
<i>MS4 Chesterfield County</i>	<i>1.98E+13</i>					
<i>MS4 Henrico County DPW</i>	<i>3.79E+13</i>					
<i>VA0063177: CSOs</i>	<i>2.71E+11</i>					
<i>Future Load</i>	<i>2.39E+12</i>					

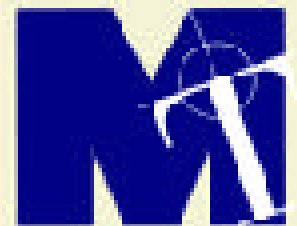


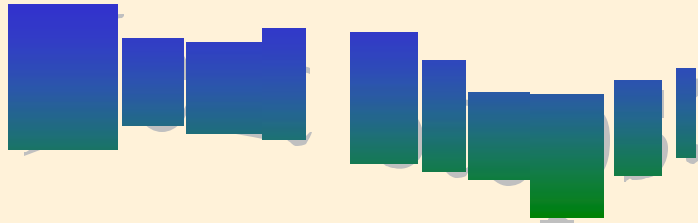
Final *E. coli* TMDL Table

Impairment	WLA	LA	MOS	TMDL	Existing Load	Percent Reduction
James River (tidal)	4.10E+14	2.71E+14	<i>Implicit</i>	6.81E+14	1.16E+15	41.10%
<i>VA0003077</i>	<i>1.74E+12</i>					
<i>VA0024163</i>	<i>2.61E+10</i>					
<i>VA0024996</i>	<i>1.76E+13</i>					
<i>VA0027910</i>	<i>1.22E+11</i>					
<i>VA0028622</i>	<i>1.57E+11</i>					
<i>VA0060194</i>	<i>4.70E+13</i>					
<i>VA0063177</i>	<i>1.48E+14</i>					
<i>VA0063649</i>	<i>6.27E+09</i>					
<i>VA0063690</i>	<i>1.31E+14</i>					
<i>VA0066494</i>	<i>2.61E+10</i>					
<i>VA0090727</i>	<i>4.36E+11</i>					
<i>VA0085499</i>	<i>7.00E+12</i>					
<i>VAG404078</i>	<i>1.74E+09</i>					
<i>VAG404208</i>	<i>1.74E+09</i>					
<i>VAG404145</i>	<i>1.74E+09</i>					
<i>VAG404175</i>	<i>1.74E+09</i>					
<i>VAG404201</i>	<i>1.74E+09</i>					
<i>VAG404224</i>	<i>1.74E+09</i>					
<i>VAG404223</i>	<i>1.74E+09</i>					
<i>VAG404029</i>	<i>1.74E+09</i>					
<i>VAG404247</i>	<i>1.74E+09</i>					
<i>VAG404224</i>	<i>1.74E+09</i>					
<i>VAG404033</i>	<i>1.74E+09</i>					
<i>VAG404248</i>	<i>1.74E+09</i>					
<i>MS4 Defense Supply Center - Richmond</i>	<i>6.43E+10</i>					
<i>MS4 City of Richmond</i>	<i>2.59E+12</i>					
<i>MS4 Chesterfield County</i>	<i>3.79E+12</i>					
<i>MS4 Henrico County DPW</i>	<i>2.04E+12</i>					
<i>VA0063177: CSOs</i>	<i>4.222E+13</i>					
<i>Future Growth</i>	<i>6.812E+12</i>					

Thank you

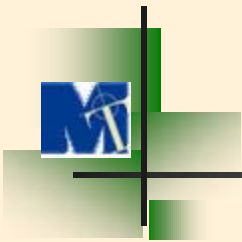
- Department of Environmental Quality
- Department of Conservation and Recreation
- Soil and Water Conservation Districts
- Greeley and Hansen
- Virginia Department of Health
- Virginia Farm Service Agency
- Watershed stakeholders





- Final Public Meeting 30-day Review
 - **Ends 4/10/2009**
 - **Submit comments to Margaret Smigo**
- Submit to EPA
- Submit to State Water Control Board
- Implementation Plan Development
- Implementation





James River – City of Richmond TMDL Contacts

Margaret Smigo, DEQ - Piedmont Regional Office

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Glen Allen, VA 23060
(804)-527-5124
mjsmigo@deq.virginia.gov

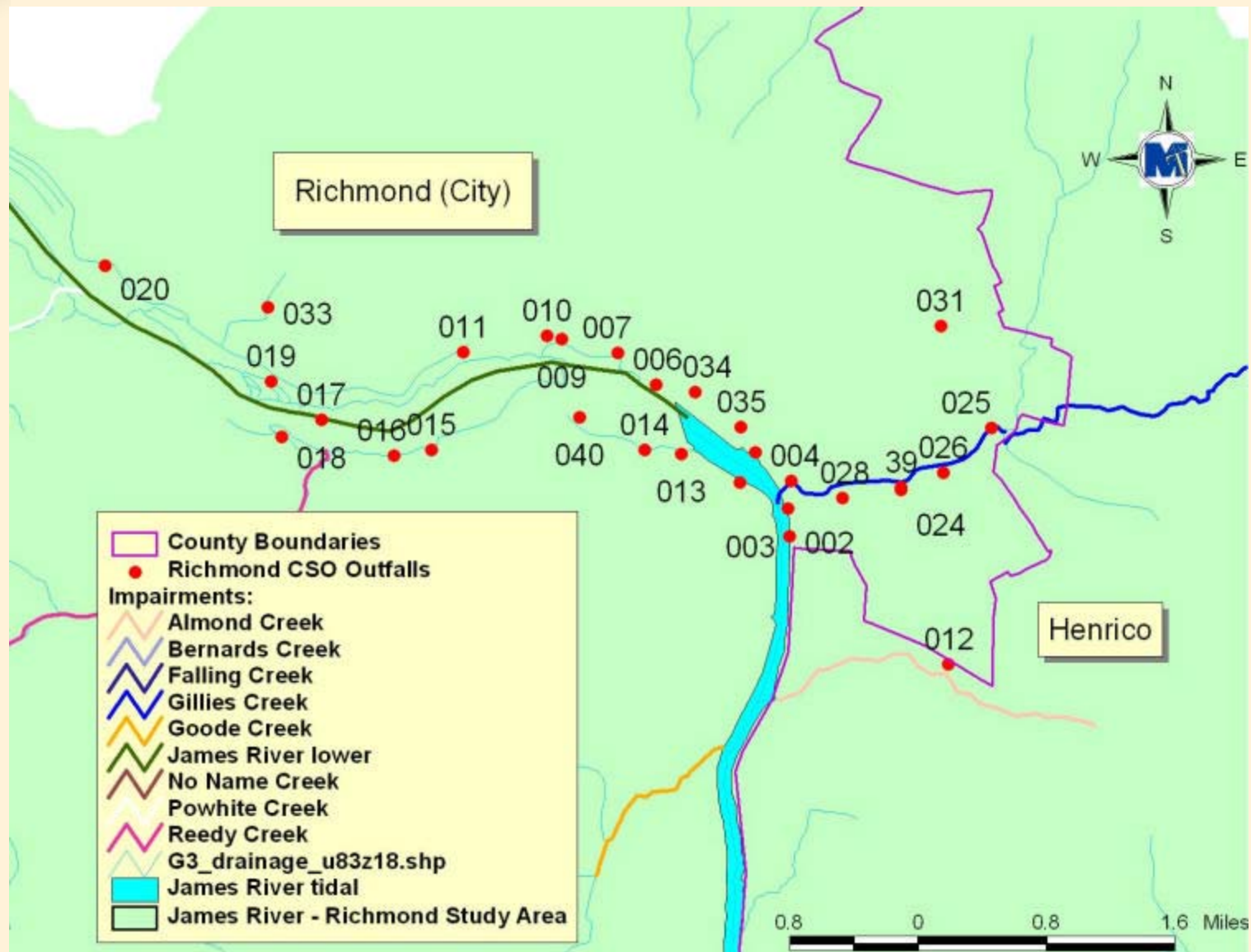
*Send Written Comments
by 4/10/2009*

Megan Maggard, MapTech, Inc.

3154 State Street
Blacksburg, VA 24060
(540) 961-7864 x407
mlaird@maptech-inc.com



CSO Locations





Modeling Details

- 3 Models were used
 - SWMM
 - ◆ City of Richmond CSO Program
 - ◆ Simulate urban storm runoff and sewage from areas draining to a CSO
 - HSPF
 - ◆ Simulate runoff, interflow, groundwater, stream flow
 - ◆ Modeled entire study area watershed
 - ◆ Used SWMM output from urban area as input to HSPF
 - CEQUALW2
 - ◆ Simulate in-stream process for tidal segment
 - ◆ Used SWMM and HSPF output as input to CEQUALW2